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PATENT SPECIFICATION

DRAWINGS ATTACHED

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Improvements in or relating to the heat-treatment of fabrics.

COMPLETE SPECIFICATION

I, YOSHIO ONISHI, a subject of Japan, of 140/5, Okazaki Enshoji-machi, Sakyo-ku, Kyoto, Japan, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to the heat treatment of fabrics comprising a thermoplastic man-made filamentary material, such fabrics being made either from the thermoplastic man-made filamentary material alone or from mixtures thereof with other filamentary material, including staple fibre, for example hemp or cotton.

It is known that fabrics comprising a thermoplastic man-made filamentary material are advantageously subjected to a heat treatment which consists of a preliminary heat set employing a heat-treatment chamber in which the fabric is conveyed therethrough by tenter-type conveyor means followed by a second heat set employing a heat-treatment chamber in which the fabric is conveyed therethrough by roller-type conveyor means. In this known arrangement, however, the treated fabric often suffers from various defects, e.g. the fabric which has undergone the preliminary heat treatment whilst maintained in a transversely stretched condition in the heat-treatment chamber with tenter-type conveyor means rapidly shrinks when the same has been discharged from the heat-treatment chamber, so that if the fabric is now fed into the heat-treatment chamber with roller-type conveyor means, its transverse or width dimension will be fixed at the value to which it has shrunk; hereinafter this defect will be termed "necking".

According to one aspect of the present invention there is provided, in a process for

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the heat-treatment of fabrics comprising thermoplastic man-made filamentary material by passing said fabric through a first heat-treatment chamber, which is provided with tenter-type conveying means, and thereafter passing the heat-treated fabric through a second heat-treatment chamber, which is provided with roller-type conveying means, the improvement which comprises adjusting the longitudinal tension exerted on said fabric after it has passed through said first heat-treatment chamber to compensate for the tendency of said fabric to neck and thereafter subjecting said fabric to a scutching operation to obtain a fabric of a desired width before said fabric is passed into said second heat-treatment chamber wherein it is heat-set.

The invention also provides an apparatus, suitable for carrying out the process of the invention, which comprises a first heat-treatment chamber provided with tenter-type conveying means for conveying a fabric through said heat-treatment chamber, a necking compensator for adjusting the longitudinal tension exerted on said fabric immediately after it leaves said first heat-treatment chamber so as to prevent substantial necking thereof, scutching means for altering the width of said fabric, and a second heat-treatment chamber provided with roller-type conveying means for heat-setting the scutched fabric.

For a better understanding of the invention, and to show how the same may be carried into effect, reference will now be made, by way of example, to the accompanying drawing in which:

Figure 1 is a side elevational view of an apparatus according to the present invention;

Figure 2 is a top plan view of the appara-

tus shown in Figure 1; and

Figures 3 and 4 are detailed views of parts of the apparatus shown in Figures 1 and 2.

5 The heat treatment apparatus comprises a heat-treatment chamber 1, which has therein a tenter-type conveying means for conveying therethrough a cloth *a* to be treated. The heat-treatment chamber is
10 arranged so that hot air is blown uniformly against the cloth *a* as it passes through the chamber 1. At the outside of the chamber 1 there is provided a necking compensator 3 and a scutching device 4 adapted to convey
15 the cloth *a*, which has come out of the treating chamber 1, to a second heat-treatment chamber 5 provided with a roller-type conveyor means 6. Water-cooled rollers 7 are provided at the exit of the heating
20 chamber 5.

A fan 8 provided within the chamber 1 serves to blow uniformly the hot air heated by a heater 9, such as a gas burner, against both surfaces of the cloth *a* through upper
25 and lower nozzles 15. The hot air escapes from the chamber 1 through an exhaust pipe 10. Similarly, within the chamber 5 a fan 11 serves to blow uniformly the hot air heated by a heater 12 against both surfaces of the cloth *a* through longitudinally
30 disposed nozzles 25. The chamber 5 is also provided with an exhaust pipe 13. At the exit of the chamber 5 there are arranged water-cooled rollers 7 for rapidly cooling the heat-set cloth. After passing round the
35 water-cooled roller 7 the cloth *a* is fed to a layering device 14.

The compensator 3 is shown in detail in Figure 3 and comprises a pair of fixed guide
40 rolls 16 and a guide roll 17 which is attached to the middle portion on one side of an endless chain 18 travelling between a pair of upper and lower chain wheels 19. The chain 18 carries on the other side an
45 adjustable weight 20. The weight of the guide roll 17 plus the adjustable weight 20 acts on the cloth *a* as a tension-compensating device so that the guide roll 17 moves upwardly if the tension of the cloth *a* increases and moves downwardly if the tension
50 decreases.

The scutching device 4 is shown in detail in Figure 4 and comprises a fixed, arcuate shaft 21, a number of resin bobbins 22
55 mounted rotatably on said shaft 21 through respective ball bearings 23, and a rubber tube 24 mounted on the bobbins. The cloth *a* is stretched transversely to a desired width when it moves over the scutching device 4.

The process and apparatus of the invention obviates the disadvantages of the known heat-treatment apparatus. Thus, after the cloth *a* has undergone a preliminary heat-set in the heat-treatment chamber 1 provided with tenter-type conveyor means its
60 tension is adjusted by the compensator 3 immediately after it is discharged from the chamber 1, whereby the cloth *a* is prevented, as much as possible, from necking or shrinking transversely. Then, the cloth *a* is
65 stretched to the desired width by the scutching device 4, whereafter it is fed into the heat-treatment chamber 5 provided with roller-type conveyor means, so that it may heat-set, such setting operation being
70 heightened by the rapid cooling of the cloth *a* by the water-cooled rollers 7 immediately after it is discharged from the chamber 5.

WHAT I CLAIM IS:—

1. In a process for the heat-treatment
80 of fabrics comprising thermoplastic man-made filamentary material by passing said fabric through a first heat-treatment chamber, which is provided with tenter-type conveying means, and thereafter passing the
85 heat-treated fabric through a second heat-treatment chamber, which is provided with roller-type conveying means, the improvement which comprises adjusting the longitudinal tension exerted on said fabric after it has passed through said first heat-treatment
90 chamber to compensate for the tendency of said fabric to neck and thereafter subjecting said fabric to a scutching operation to obtain a fabric of a desired width
95 before said fabric is passed into said second heat-treatment chamber wherein it is heat-set.

2. A process for the heat-treatment of fabrics comprising thermoplastic man-made
100 filamentary material, substantially as hereinbefore described with reference to the accompanying drawing.

3. An apparatus, suitable for use in the process defined in Claim 1, which comprises
105 a first heat-treatment chamber provided with tenter-type conveying means for conveying a fabric through said heat-treatment chamber, a necking compensator for adjusting the longitudinal tension exerted on said fabric immediately after it leaves said first
110 heat-treatment chamber so as to prevent substantial necking thereof, scutching means for altering the width of said fabric, and a second heat-treatment chamber provided with roller-type conveying means for heat-setting the scutched fabric.

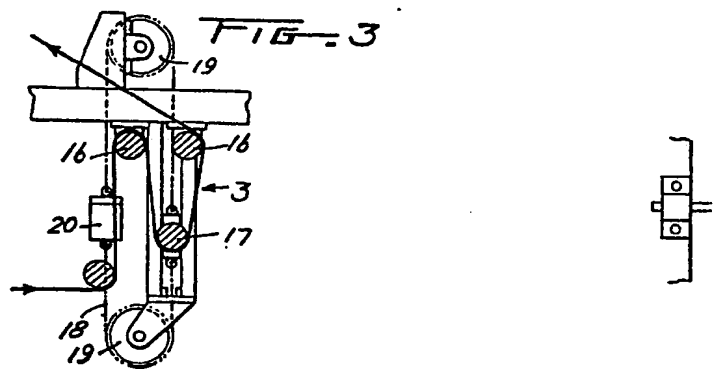
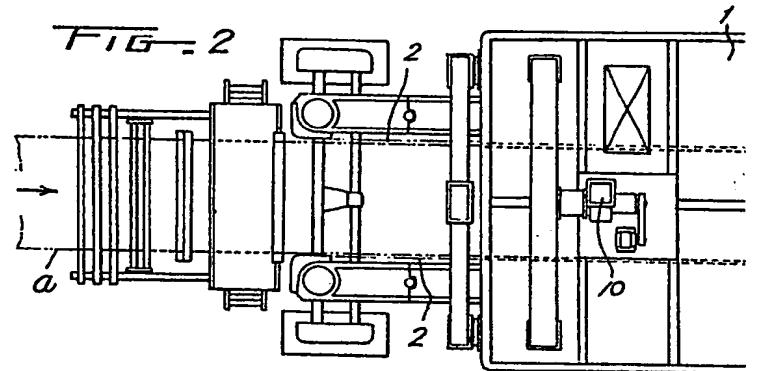
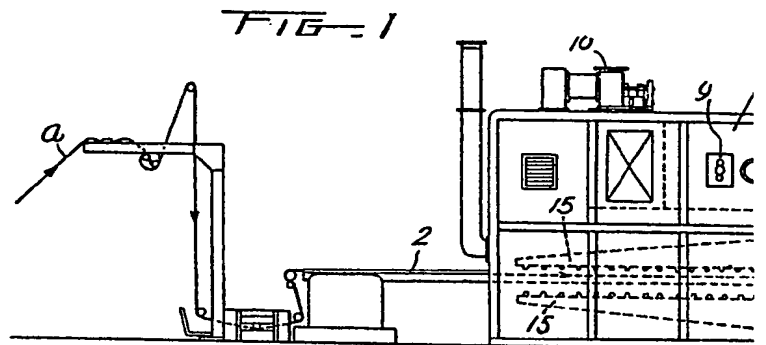
4. An apparatus as claimed in Claim 3, wherein said apparatus is further provided

with cooling means for rapidly cooling said fabric after it leaves said second heat-treatment chamber.

- 5 5. An apparatus, suitable for use in the process defined in Claim 1, substantially as hereinbefore described with reference to, and as shown in, the accompanying drawing.

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1 SHEET

COMPLETE SPECIFICATION

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the Original on a reduced scale.*

